

while the terminal embryonal cells divide repeatedly to form a club-shaped mass of cells from which differentiate the two cotyledons. The swollen radicular end organises much later.

The ripe fruit is a "pseudoberry" and consists of three main parts—pericarp, endosperm and embryo. The pericarp comprises 4 zones—an outer leathery coat followed by the viscid, parenchymatous and vascular layers (Fig. 19). The endosperm is vase-like with a solid truncated basal part and a wider, hollow, 5-lobed upper region enclosing the cotyledons. The latter are fused except in the region of the plumule. The radicular end, which represents only the extension of the hypocotyledonary region, closely fits at the apex of the endosperm.

The ovaries of *Dendrophthoe*, *Scurrula*, *Helixanthera*, *Taxillus*, *Barathranthus*, *Tapinanthus* and *Tupeia* show extreme reduction and there is no trace of a mamelon. In *Macrosolen*, on the other hand, there is a well developed mamelon with three basal lobes. *Helicanthes elastica* is intermediate since it has a conical mamelon but this is devoid of any basal lobes. Therefore, Danser's<sup>1</sup> assignment of *Helicanthes* to the tribe Loranthaceae, which includes *Scurrula*, *Dendrophthoe*, *Helixanthera*, etc., is considered unsatisfactory. It is suggested that *Helicanthes* should be assigned to a new tribe, Helicantheae.

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Dept. of Botany,  
University of Delhi,  
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B. M. JOHRI.  
J. S. AGRAWAL.

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#### EMBRYO SAC OF SCILLA

As early as 1880 Treub and Mellink<sup>4</sup> reported that in *Agraphis patula* (*Scilla hispanica*) the embryo sac develops from the upper dyad cell while the lower one does not proceed beyond the 4-nucleate stage. Similar observations have

been recorded for several other species; *S. campanulata*, *S. nutans* and *S. hyacinthoides* (Guignard<sup>4</sup>); *S. campanulata* and *S. hyacinthoides* var. *cœrulea* (McKenney<sup>5</sup>); *S. sibirica* (Schniewind-Thies,<sup>4</sup>); and *S. nonscripta* (Hoare<sup>3</sup>). On the other hand, Govindappa and Sheriff<sup>1</sup> have recently reported that in *S. indica* the embryo sac is monosporic, 8-nucleate and conforms to the Polygonum type. To decide whether the embryo sac is mono- or bisporic, it was considered worthwhile to re-investigate *S. indica* Baker and as some material of *S. hyacinthina* Bach. (collected from the Bogor Botanical Gardens) was also available, opportunity was taken to investigate both the species.

The observations on *S. indica* confirm the findings of Govindappa and Sheriff. The embryo sac is monosporic and 8-nucleate. In addition, a few polyploid 4- and 8-nucleate embryo sacs in the same species have also been observed. The polyploid embryo sacs and their nuclei were almost double the size of the normal embryo sacs.

*S. indica* has a wide distribution in India. Raghavan and Venkatasubban<sup>6</sup> have reported the existence of three aneuploid races ( $2n = 44, 45, 46$ ) in South India. According to these authors the first two races are morphologically indistinguishable but the third has distinctly broader leaves. Sunder Rao<sup>6</sup> reports the existence of a fourth race from Sagar with 58 somatic chromosomes. In this case the leaves show blotches of dark green to black colour. The material showing polyploid embryo sacs belonged to this race.

In *S. hyacinthina* the hypodermal archesporial cell cuts off a parietal cell (Fig. 1). Occasionally a nucellar cell situated immediately below the megaspore mother cell enlarges in size and somewhat simulates the appearance of a sporogenous cell (Fig. 1). Figs. 3 and 4 show a similar cell below the tetrad. The vacuoles on either side of the nucleus give it the false appearance of a functioning megaspore.

The megaspore mother cell undergoes the usual reduction divisions and the tetrad may be oblique, T-shaped or linear (Figs. 2-6). The chalazal megaspore functions as is evident from Figs. 3-6.

Different types of embryo sacs are not very common within the limits of the same genus but they do occur occasionally. *Nothoscordum* (Messeri<sup>4</sup>) shows Polygonum and Allium types of development while *Erythronium* (Haque<sup>2</sup>)